

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

## IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents will not correct images,  
please do not report the images to the  
Image Problem Mailbox.

*Jack*  
*PA*

---

CLAIMS

- 1        1. A method for protecting a MEMS structure during a dicing of a MEMS wafer to  
2 produce individual MEMS dies, comprising the steps of:  
3              (a) preparing a MEMS wafer having a plurality of MEMS structure sites thereon;  
4              (b) mounting, upon the MEMS wafer, a wafer cap to produce a laminated MEMS wafer,  
5 the wafer cap being recessed in areas corresponding to locations of the MEMS structure sites on  
6 the MEMS wafer; and  
7              (c) dicing the laminated MEMS wafer into a plurality of MEMS dies.
  
- 1        2. The method as claimed in claim 1, wherein the laminated MEMS wafer is diced using  
2 a saw.
  
- 1        3. The method as claimed in claim 1, wherein the laminated MEMS wafer is diced using  
2 a laser.
  
- 1        4. The method as claimed in claim 1, wherein the laminated MEMS wafer is diced using  
2 scribing and breaking.
  
- 1        5. The method as claimed in claim 1, wherein the wafer cap is a cover tape with an  
2 adhesive medium.
  
- 1        6. The method as claimed in claim 1, wherein the wafer cap includes an adhesive  
2 medium.
  
- 1        7. The method as claimed in claim 6, wherein the adhesive medium is an ultraviolet light  
2 releasable medium.
  
- 1        8. The method as claimed in claim 6, wherein the adhesive medium is a heat releasable  
2 medium.
  
- 1        9. The method as claimed in claim 6, wherein the adhesive medium is a combination of  
2 an ultraviolet light and heat releasable medium.
  
- 1        10. The method as claimed in claim 6, wherein the adhesive medium comprises a  
2 thermoplastic organic material.

- 1        11. The method as claimed in claim 6, wherein the adhesive medium comprises an  
2 ultraviolet light sensitive organic material.
- 1        12. The method as claimed in claim 6, wherein the adhesive medium comprises a solder  
2 material.
- A  
1        13. The method as claimed in claim 1, wherein the wafer cap is attached to the MEMS  
2 wafer through mechanical means.
- 1        14. The method as claimed in claim 1, wherein the wafer cap is attached to the MEMS  
2 wafer through bonds produced by applying the wafer cap to the MEMS wafer with a  
3 predetermined amount of pressure.
- B  
1        15. The method as claimed in claim 1, further comprising the step of:  
2        (d) applying a contiguous tape on a backside of the MEMS wafer, the backside of the  
3 MEMS wafer being a side opposite of a side having the MEMS structure sites located thereon.
- C  
1        16. The method as claimed in claim 15, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer after the wafer cap is mounted on the MEMS wafer.
- D  
1        17. The method as claimed in claim 15, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the wafer cap is mounted on the MEMS wafer.
- E  
1        18. The method as claimed in claim 15, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the laminated MEMS wafer is sawn.
- F  
1        19. The method as claimed in claim 15, wherein the contiguous tape is not cut when the  
2 laminated MEMS wafer is diced.
- G  
1        20. The method as claimed in claim 5, further comprising the step of:  
2        (d) applying a contiguous tape on a backside of the MEMS wafer, the backside of the  
3 MEMS wafer being a side opposite of a side having the MEMS structure sites located thereon.
- H  
1        21. The method as claimed in claim 20, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer after the wafer cap is mounted on the MEMS wafer.

1        22. The method as claimed in claim 20, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the wafer cap is mounted on the MEMS wafer.

1        23. The method as claimed in claim 20, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the laminated MEMS wafer is sawn.

1        24. The method as claimed in claim 20, wherein the contiguous tape is not cut when the  
2 laminated MEMS wafer is diced.

1        25. The method as claimed in claim 1, wherein the wafer cap comprises silicon-based  
2 material.

1        26. The method as claimed in claim 25, wherein the wafer cap includes an organic  
2 adhesive medium.

1        27. The method as claimed in claim 1, wherein the wafer cap comprises a glass-based  
2 material.

1        28. The method as claimed in claim 1, wherein the wafer cap comprises a ceramic-based  
2 material.

1        29. The method as claimed in claim 1, wherein the wafer cap comprises a polymer-based  
2 material.

1        30. The method as claimed in claim 1, wherein the laminated MEMS wafer is diced with  
2 a wafer saw with a wafer cap side of the laminated MEMS wafer facing towards a cutting device  
3 of the wafer saw such that the wafer cap is sawn before the MEMS wafer.

1        31. A method for protecting a MEMS structure during a production of individual MEMS  
2 dies, comprising the steps of:

3              (a) fabricating a MEMS wafer having a plurality of MEMS structure sites thereon;

4              (b) fabricating a wafer cap;

5              (c) bonding the wafer cap to the MEMS wafer to produce a laminated MEMS wafer, the  
6 wafer cap being recessed in areas corresponding to locations of the MEMS structure sites on the  
7 MEMS wafer;

8              (d) dicing the laminated MEMS wafer into a plurality of MEMS dies; and

- 9                         (e) removing the wafer cap from the laminated MEMS wafer.
- 1                         32. The method as claimed in claim 31, further comprising the step of:  
2                         (f) removing individual dies from the diced laminated MEMS wafer before the wafer cap  
3 is removed from the laminated MEMS wafer.
- 1                         33. The method as claimed in claim 31, further comprising the step of:  
2                         (f) mounting dies from the diced laminated MEMS wafer into a package before the wafer  
3 cap is removed from the laminated MEMS wafer.
- 1                         34. The method as claimed in claim 31, further comprising the step of:  
2                         (f) mounting dies from the diced laminated MEMS wafer into a package after the wafer  
3 cap is removed from the laminated MEMS wafer.
- 1                         35. The method as claimed in claim 31, further comprising the steps of:  
2                         (f) removing individual dies from the diced laminated MEMS wafer before the wafer cap  
3 is removed from the laminated MEMS wafer; and  
4                         (g) mounting the dies removed from the diced laminated MEMS wafer into a package  
5 before the wafer cap is removed from the laminated MEMS wafer.
- 1                         36. The method as claimed in claim 31, wherein the wafer cap includes an adhesive  
2 medium.
- 1                         37. The method as claimed in claim 36, wherein the adhesive medium is an ultraviolet  
2 light releasable medium.
- 1                         38. The method as claimed in claim 36, wherein the adhesive medium is a heat  
2 releasable medium.
- 1                         39. The method as claimed in claim 36, wherein the adhesive medium is a combination  
2 of an ultraviolet light and heat releasable medium.
- 1                         40. The method as claimed in claim 36, wherein the adhesive medium comprises a  
2 thermoplastic organic material.

1        41. The method as claimed in claim 36, wherein the adhesive medium comprises an  
2 ultraviolet light sensitive organic material.

1        42. The method as claimed in claim 36, wherein the adhesive medium comprises a solder  
2 material.

A1        1        43. The method as claimed in claim 31, further comprising the step of:  
2              (f) applying a contiguous tape on a backside of the MEMS wafer, the backside of the  
3              MEMS wafer being a side opposite of a side having the wafer cap located thereon.

1        44. The method as claimed in claim 43, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer after the wafer cap is mounted on the MEMS wafer.

1        45. The method as claimed in claim 43, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the wafer cap is mounted on the MEMS wafer.

1        46. The method as claimed in claim 43, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the laminated MEMS wafer is sawn.

1        47. The method as claimed in claim 31, wherein the wafer cap comprises silicon-based  
2 material.

1        48. The method as claimed in claim 31, wherein the wafer cap comprises a glass-based  
2 material.

1        49. The method as claimed in claim 31, wherein the wafer cap comprises a ceramic-  
2 based material.

1        50. The method as claimed in claim 31, wherein the wafer cap comprises a polymer-  
2 based material.

1        51. The method as claimed in claim 31, wherein the laminated MEMS wafer is sawn on  
2 a wafer saw with a wafer cap side of the laminated MEMS wafer facing towards a cutting device  
3 such that the wafer cap is sawn before the MEMS wafer.

1        52. The method as claimed in claim 31, wherein the wafer cap is attached to the MEMS  
2 wafer through mechanical means.

1       53. The method as claimed in claim 31, wherein the wafer cap is attached to the MEMS  
2 wafer through bonds produced by applying the wafer cap to the MEMS wafer with a  
3 predetermined amount of pressure.

1       54. A laminated MEMS wafer, comprising:  
2           a MEMS wafer having a plurality of MEMS structure sites located thereon; and  
3           a removable wafer cap;  
4           said removable wafer cap being bonded to the MEMS wafer to produce a laminated  
5 MEMS wafer, the wafer cap being recessed in areas corresponding to locations of the MEMS  
6 structure sites on the MEMS wafer.

1       55. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap includes  
2 a releasable adhesive medium.

1       56. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium is an ultraviolet light releasable medium.

1       57. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium is a heat releasable medium.

1       58. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium is a combination of an ultraviolet light and heat releasable medium.

1       59. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium comprises a thermoplastic organic material.

1       60. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium comprises an ultraviolet light sensitive organic material.

1       61. The laminated MEMS wafer as claimed in claim 55, wherein the releasable adhesive  
2 medium comprises a solder material.

1       62. The laminated MEMS wafer as claimed in claim 54, further comprising:  
2           a contiguous tape applied on a backside of the MEMS wafer, the backside of the MEMS  
3 wafer being a side opposite of a side having the MEMS structure sites located thereon.

1        63. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises silicon-based material.

1        64. The laminated MEMS wafer as claimed in claim 58, wherein the releasable adhesive  
2 medium comprises an organic material.

1        65. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises a glass-based material.

1        66. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises a ceramic-based material.

1        67. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises a polymer-based material.

1        68. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap is  
2 attached to the MEMS wafer through mechanical means.

1        69. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap is  
2 attached to the MEMS wafer through bonds produced by applying the wafer cap to the MEMS  
3 wafer with a predetermined amount of pressure.

1        70. A method for protecting a MEMS structure during a dicing of a MEMS wafer to  
2 produce individual MEMS dies, comprising the steps of:

- 3              (a) preparing a MEMS wafer having a plurality of MEMS structure sites thereon;
- 4              (b) mounting, using an adhesive layer, a wafer cap, to produce a laminated MEMS wafer,  
5              the wafer cap being recessed in areas corresponding to locations of the MEMS structure sites on  
6              the MEMS wafer; and
- 7              (c) dicing the laminated MEMS wafer into a plurality of MEMS dies.

1        71. The method as claimed in claim 70, wherein the laminated MEMS wafer is diced  
2 using a saw.

1        72. The method as claimed in claim 70, wherein the laminated MEMS wafer is diced  
2 using a laser.

1        73. The method as claimed in claim 70, wherein the laminated MEMS wafer is diced  
2 using scribing and breaking.

1        74. The method as claimed in claim 70, wherein the adhesive layer is an ultraviolet light  
2 releasable medium.

1        75. The method as claimed in claim 70, wherein the adhesive layer is a heat releasable  
2 medium.

1        76. The method as claimed in claim 70, wherein the adhesive layer is a combination of  
2 an ultraviolet light and heat releasable medium.

1        77. The method as claimed in claim 70, wherein the adhesive layer comprises a  
2 thermoplastic organic material.

1        78. The method as claimed in claim 70, wherein the adhesive layer comprises an  
2 ultraviolet light sensitive organic material.

1        79. The method as claimed in claim 70, further comprising the step of:  
2            (d) applying a contiguous tape on a backside of the MEMS wafer, the backside of the  
3            MEMS wafer being a side opposite of a side having the MEMS structure sites located thereon.

1        80. The method as claimed in claim 75, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer after the wafer cap is mounted on the MEMS wafer.

1        81. The method as claimed in claim 75, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the wafer cap is mounted on the MEMS wafer.

1        82. The method as claimed in claim 70, wherein the wafer cap comprises silicon-based  
2 material.

1        83. The method as claimed in claim 82, wherein the adhesive layer is an organic  
2 adhesive medium.

1        84. The method as claimed in claim 70, wherein the wafer cap comprises a glass-based  
2 material.

1        85. The method as claimed in claim 70, wherein the wafer cap comprises a ceramic-based material.

1        86. The method as claimed in claim 70, wherein the wafer cap comprises a polymer-based material.

1        87. The method as claimed in claim 70, wherein the laminated MEMS wafer is diced  
2 with a wafer saw with a wafer cap side of the laminated MEMS wafer facing towards a cutting  
3 device of the wafer saw such that the wafer cap is sown before the MEMS wafer.

1        88. The method as claimed in claim 70, wherein the adhesive layer is applied to the  
2 MEMS wafer around the MEMS structure sites.

1        89. The method as claimed in claim 70, wherein the adhesive layer is applied to the  
2 wafer caps at non-recessed areas.

1        90. The method as claimed in claim 70, further comprising the step of:

2        (d) removing individual dies from the diced laminated MEMS wafer before the wafer cap  
3 is removed from the laminated MEMS wafer.

1        91. The method as claimed in claim 70, further comprising the step of:

2        (d) mounting dies from the diced laminated MEMS wafer into a package before the wafer  
3 cap is removed from the laminated MEMS wafer.

1        92. The method as claimed in claim 70, further comprising the step of:

2        (d) mounting dies from the diced laminated MEMS wafer into a package after the wafer  
3 cap is removed from the laminated MEMS wafer.

1        93. The method as claimed in claim 70, wherein the wafer cap is a cover tape with an  
2 adhesive medium.

1        94. The method as claimed in claim 93, further comprising the step of:

2        (d) applying a contiguous tape on a backside of the MEMS wafer, the backside of the  
3 MEMS wafer being a side opposite of a side having the MEMS structure sites located thereon.

1        95. The method as claimed in claim 94, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer after the wafer cap is mounted on the MEMS wafer.

1        96. The method as claimed in claim 94, wherein the contiguous tape is applied to a  
2 backside of the MEMS wafer before the wafer cap is mounted on the MEMS wafer.

1        97. The method as claimed in claim 1, wherein the wafer cap comprises a metal.

1        98. The method as claimed in claim 31, wherein the wafer cap comprises a metal.

1        99. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises a metal.

1        100. The method as claimed in claim 70, wherein the wafer cap comprises a metal.

1        101. The method as claimed in claim 1, wherein the wafer cap comprises a static  
2 dissipative material.

1        102. The method as claimed in claim 31, wherein the wafer cap comprises a static  
2 dissipative material.

1        103. The laminated MEMS wafer as claimed in claim 54, wherein the wafer cap  
2 comprises a static dissipative material.

1        104. The method as claimed in claim 70, wherein the wafer cap comprises a static  
2 dissipative material.

1        105. The method as claimed in claim 15, wherein the contiguous tape comprises a static  
2 dissipative material.

1        106. The method as claimed in claim 20, wherein the contiguous tape comprises a static  
2 dissipative material.

1        107. The method as claimed in claim 43, wherein the contiguous tape comprises a static  
2 dissipative material.

1        108. The laminated MEMS wafer as claimed in claim 62, wherein the contiguous tape  
2        comprises a static dissipative material.

1        109. The method as claimed in claim 79, wherein the contiguous tape comprises a static  
2        dissipative material.

1        110. The method as claimed in claim 94, wherein the contiguous tape comprises a static  
2        dissipative material.